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EXAMINER  
MUSSEY, BARBARA J

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NOV 16 2004

**GROUP 1700**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/896,439  
Filing Date: June 29, 2001  
Appellant(s): WILSON, KENNETH P

**MAILED**

NOV 16 2004

**GROUP 1700**

Katherine Hamer  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 10/21/04.

**(1) Real Party in Interest**

A statement identifying the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) Status of Claims**

The statement of the status of the claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of invention contained in the brief is correct.

**(6) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(7) Grounds of Rejection**

**A1.** Claims 1-6 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Binning et al. and Lambdin Jr.(U.S. Patent 3,573,086).

The admitted prior art discloses carbonizing a viscose rayon woven mat, impregnating it with a resin, and lining the interior of a rocket nozzle with the impregnated material to act as an ablative material. However, such material is no

Art Unit: 1733

longer available.(Specification, Pg. 1-3) The admitted prior art does not disclose using a polyaramid mat in place of the viscose rayon mat. Binning et al. discloses carbonizing a polyaramid fiber mat and using it in combination with a resin.(Col. 2, ll. 41-42) The fibrous mat can then be used for nose cones or rocket nozzle exhausts.(Col. 1, ll. 35; Col. 2, ll. 39-43) A less preferred fiber is rayon.(Col. 3, ll. 26) It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the rayon of the admitted prior art with polyaramid since rayon is no longer available and since Binning et al. prefers polyaramid to rayon(Col. 3, ll. 22-26) and particularly since Binning et al. discloses such material can be used in the same type of environments as appellant's(Col. 2, ll. 38-40).

The references do not disclose the denier of the fibers used to form the reinforcement. Lambdin discloses that when making carbonized impregnated fiber composites for rocket nozzles from rayon, the denier of the fiber is around 2.3 denier.(Col. 1, ll. 35-40; Col. 3, ll. 30) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use 2.3 denier fiber to form the reinforcement since one in the art would use any conventional size fiber and Lambdin discloses this denier reinforcement has been used previously in carbonized impregnated fiber composites which can be used in rocket nozzles.(Col. 1, ll. 35-40)

Regarding claims 2 and 3, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20) This suggests the fibers are carded and yarn-spun as that is how yarn is formed. Additionally, one in the art would appreciate that the fiber would be formed via any

conventional method such as carding and yarn-spinning. Absent unexpected results this is considered obvious.

Regarding claim 4, Binning et al. discloses the fibers can be in a matted form.(Col. 3, ll. 38-40) Felts and flocks are made of matted fibers.

Regarding claims 5 and 6, the Binning et al. discloses the fibers can be used in rocket nozzles and nose cones.(Col. 2, ll. 39-40) Since the material is flexible(Col. 1, ll. 28), one in the art would appreciate that the material would be used as a lining for the nozzle and nose cone rather than forming the external surface.

Regarding claim 13, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20)

Regarding claim 15, Binning et al. discloses carbonizing the fibers.(Abstract)

**A2.** Claims 7-12 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Binning et al., and Lambdin Jr. as applied to claim 1 above, and further in view of Hirsch et al.(U.S. Patent 3,576,769).

The references cited above do not specifically disclose the polyaramid being poly(m-phenyleneisophthalamide)[NOMEX] though Binning et al. does disclose the polyaramid can be a phenylene which is not ortho, leaving only the choices of meta and para.(Col. 1, ll. 52-54) The first, and simplest, choice of the pendant groups in Binning et al. is hydrogen.(Col. 1, ll. 36-50) NOMEX is a meta-phenylene with hydrogen as the pendant groups(R, X, Y). Hirsch et al. discloses carbonizing polyaramid to form ablative composites wherein the polyaramid can be NOMEX.(Abstract; Col. 3, ll. 9-10) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any type of polyaramid such as NOMEX as the polyaramid in the admitted prior

Art Unit: 1733

art, Binning et al., and Lambdin, Jr. since Binning et al. discloses using polyaramids having phenylenes which are not ortho and which have hydrogens as the pendant groups such as NOMEX and KEVLAR, and since Hirsch et al. shows that NOMEX is known in the art as a heat-resistant material(Abstract) and as a heat shield.(Col. 7, ll. 12-13) Absent unexpected results, this is considered obvious.

Regarding claims 8 and 9, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20) This suggests the fibers are carded and yarn-spun as that is how yarn is formed. Additionally, one in the art would appreciate that the fiber would be formed via any conventional method such as carding and yarn-spinning. Absent unexpected results this is considered obvious.

Regarding claim 10, Binning et al. discloses the fibers can be in a matted form.(Col. 3, ll. 38-40) Felts and flocks are made of matted fibers.

Regarding claims 11 and 12, the Binning et al. discloses the fibers can be used in rocket nozzles and nose cones.(Col. 2, ll. 39-40) Since the material is flexible(Col. 1, ll. 28), one in the art would appreciate that the material would be used as a lining for the nozzle and nose cone rather than forming the external surface.

Regarding claim 16, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20)

Regarding claim 18, Binning et al. discloses carbonizing the fibers.(Abstract)

**A3.** Claims 1-6 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Binning et al. in view of the admitted prior art and Lambdin Jr.

Binning et al. discloses carbonizing a polyaramid fiber mat and using it in combination with resin. The mat can then be used for nose cones or rocket nozzle

exhausts.(Col. 1, ll. 35; Col. 2, ll. 39-43; Col. 3, ll. 22-40) The reference does not specifically state the mat is impregnated with resin. However, it does disclose the fibers can be employed with resin.(Col. 2, ll. 41-42) The conventional way of employing resin with fibrous mats is by impregnating the fibers with the resin as shown for example by the admitted prior art which discloses carbonizing a viscose rayon woven mat, impregnating it with a resin, and lining the interior of a rocket nozzle with the impregnated material.(Specification, Pg. 1-3) It would have been obvious to one of ordinary skill in the art at the time the invention was made to impregnate the fiber mat of Binning et al. with resin as in the admitted prior art since this is the conventional method of employing resin with fiber and since Binning et al. suggests the use of resin with fiber. The reference discloses the material can be used as an ablative nose cone. Therefore, one in the art would understand that the material was ablative.

The references do not disclose the denier of the fibers used to form the reinforcement. Lambdin discloses that when making carbonized impregnated fiber composites for rocket nozzles, the denier of the fiber is around 2.3 denier.(Col. 1, ll. 35-40; Col. 3, ll. 30) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use 2.3 denier fiber to form the reinforcement since one in the art would use any conventional size fiber and this denier reinforcement has been used previously in carbonized impregnated fiber composites used in rocket nozzles.(Col. 1, ll. 35-40)

Regarding claims 2 and 3, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20) This suggests the fibers are carded and yarn-spun as that is how yarn is formed.

Art Unit: 1733

Additionally, one in the art would appreciate that the fiber would be formed via any conventional method such as carding and yarn-spinning. Absent unexpected results this is considered obvious.

Regarding claim 4, Binning et al. discloses the fibers can be in a matted form.(Col. 3, ll. 38-40) Felts and flocks are made of matted fibers.

Regarding claims 5 and 6, Binning et al. discloses the fibers can be used in rocket nozzles and nose cones.(Col. 2, ll. 39-40) Since the material is flexible(Col. 1, ll. 28), one in the art would appreciate that the material would be used as a lining for the nozzle and nose cone rather than forming the external surface.

Regarding claim 13, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20)

Regarding claim 15, Binning et al. discloses carbonizing the fibers.(Abstract)  
Claims 7-12 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Binning et al., the admitted prior art, and Lambdin Jr. as applied to claim 1 above, and further in view of Hirsch et al.(U.S. Patent 3,576,769).

The references cited above do not disclose the polyaramid being poly(m-phenyleneisophthalamide)[NOMEX] though Binning et al. does disclose the polyaramid can be a phenylene which is not ortho.(Col. 1, ll. 52-54) The first, and simplest, choice of the pendant groups in Binning et al. is hydrogen.(Col. 1, ll. 36-50) NOMEX is a meta-phenylene with hydrogen as the pendant groups(R, X, Y). Hirsch et al. discloses carbonizing polyaramid to form ablative composites wherein the polyaramid can be NOMEX.(Abstract; Col. 3, ll. 9-10) It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any type of polyaramid such as



NOMEX as the polyaramid in the admitted prior art, Binning et al., and Lambdin, Jr. since Binning et al. discloses using polyaramids having phenylenes which are not ortho and which have hydrogens as the pendant groups, and since Hirsch et al. shows that NOMEX is known in the art as a heat-resistant material(Abstract) and as a heat shield.(Col. 7, ll. 12-13) Absent unexpected results, this is considered obvious.

Regarding claims 8 and 9, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20) This suggests the fibers are carded and yarn-spun as that is how yarn is formed. Additionally, one in the art would appreciate that the fiber would be formed via any conventional method such as carding and yarn-spinning. Absent unexpected results this is considered obvious.

Regarding claim 10, Binning et al. discloses the fibers can be in a matted form.(Col. 3, ll. 38-40) Felts and flocks are made of matted fibers.

Regarding claims 11 and 12, Binning et al. discloses the fibers can be used in rocket nozzles and nose cones.(Col. 2, ll. 39-40) Since the material is flexible(Col. 1, ll. 28), one in the art would appreciate that the material would be used as a lining for the nozzle and nose cone rather than forming the external surface.

Regarding claim 16, Binning et al. describes the fibers as yarn.(Col. 4, ll. 20)

Regarding claim 18, Binning et al. discloses carbonizing the fibers.(Abstract)

**(8) Response to Argument**

In response to appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention

Art Unit: 1733

where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to one of ordinary skill in the art at the time the invention was made to impregnate the fiber mat of Binning et al. with resin since this is the conventional method of employing resin with fiber and since Binning et al. suggests the use of resin with fiber. Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the rayon of the admitted prior art with polyaramid since rayon is no longer available and since Binning et al. prefers polyaramid to rayon and particularly since Binning et al. discloses such material can be used in the same type of environments as appellant's. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any type of polyaramid such as NOMEX as the polyaramid in the admitted prior art, Binning et al. and Lambdin Jr., or alternatively the admitted prior art, Binning et al, and Lambdin Jr., since Binning et al. discloses using polyaramids having phenylenes which are not ortho, since Binning et al. does not indicate only specific polyaramids can be used, and since Hirsch et al. shows that NOMEX is known in the art as a heat-resistant material. (Abstract) Absent unexpected results, this is considered obvious.

Regarding appellant's argument that Binning does not disclose a precursor material comprising at least one aromatic polyamide having a denier per fiber of 1.5-3, Binning does disclose a precursor material comprising at least one aromatic

polyamide.(Col. 1, ll. 33-36; Col. 3, ll. 37-39) The reference is silent as to the diameter of the fibers. Therefore, one in the art would look to other references making the same types of material for the same end use. Lambdin, Jr. et al. is directed to making ablative materials for the same use and of the same material as the admitted prior art and discloses the fiber denier can be 2.3. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use any conventional size fiber such as 2.3 denier since Lambdin discloses such fiber sizes have been used to make ablative materials in rockets before, particularly since Ogawa et al.(U.S. Patent 4,830,845) and Ezekiel(U.S. Patent 3,635,675) show by a preponderance of the evidence using fiber sizes of 1.5-3 denier for carbonized fibers for use in ablative materials.(Col. 7, ll. 34; Col. 3, ll. 43 respectively)

Regarding appellant's argument that just because Binning et al. teaches phenylenes which are not ortho does not render it obvious to use any polyaramid in the claimed invention, the fact the Binning indicates that polyaramids are preferred to rayon in applications such as the rocket nozzle of appellant is what makes it obvious to use any of the polyaramids of Binning in the admitted prior art.

Regarding appellant's argument that Hirsch teaches away from the invention since it discloses partially carbonizing the fibers, Hirsch is used to show that the use of NOMEX is known in the carbonized fiber art. Binning already discloses the genus of which NOMEX is a species. This genus is relatively small, and NOMEX and KEVLAR are the simplest elements of it.

Art Unit: 1733

Regarding appellant's argument that the denier of Lambdin is for a rayon fiber and not a polyaramid fiber, they are directed to forming the same thing, namely fiber composites used in rocket nozzles. Absent evidence that the properties of the materials are so substantially different that different denier fibers would be required, it would have been obvious to use the same denier fiber for the different materials since they are being used to form the same end product.


Regarding appellant's argument that Lambdin does not teach using 2.3 denier fiber in rocket nozzles, it teaches using 2.3 denier fiber to form fiber composites and these composites can be used to form rocket nozzles. (Col. 1, ll. 33-38)

Regarding appellant's argument that Binning teaches using rayon in combination with polyaramid, one reading the patent carefully would understand that it is indicating what other materials may be used in addition to those described. The reference uses the term "in addition" to indicate "in place of" rather than "in combination with" particularly since in column 3, line 32, the reference refers to "cellulose fibers", not a mixture of cellulose fibers and another material. Finally, even if the reference meant that the materials were used in combination with each other, it still clearly indicates polyaramids are preferred to rayon since they can be used separately. For the above reasons, it is believed that the rejections should be sustained.

Application/Control Number: 09/896,439  
Art Unit: 1733

Page 12

Respectfully submitted,

  
BJM  
November 9, 2004

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